

## ABSTRACT

A thermoelectric heat pump module of the type used in small cooling applications and appliances, such as a thermoelectric picnic cooler. The module comprises an array of thermoelectric elements with cold-side connectors directly bonded to a large, unitary cold sink for support, and hot-side connectors each having an integrated heat exchange fin to form a small, lightweight, but efficient hot sink array directly bonded to the elements without thermal stress. The cold sink is larger than the hot sink array. The cold-side connectors and at least portions of the thermoelectric elements are sealed and supported with a layer of potting material built up from the surface of the cold sink, and optionally insulated with an additional layer of sealed foam, eliminating moisture vapor transmission, condensation, and corrosion in the module. In a preferred form, the elements and their finned hot-side connectors are arranged in an elongated, narrow-depth array designed to be placed perpendicular to a flow of cooling air, and allowing multiple modules to be used in a distributed pattern with a single air-mover such as a fan.